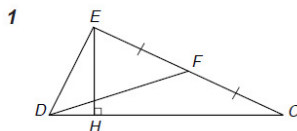


Study Guide

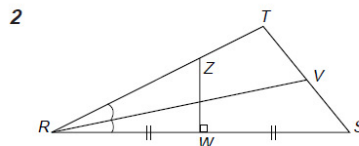
Student Edition
Pages 238–244**Special Segments in Triangles**

Four special types of segments are associated with triangles.

- A **median** is a segment that connects a vertex of a triangle to the midpoint of the opposite side.
- An **altitude** is a segment that has one endpoint at a vertex of a triangle and the other endpoint on the line containing the opposite side so that the altitude is perpendicular to that line.
- An **angle bisector** of a triangle is a segment that bisects an angle of the triangle and has one endpoint at the vertex of that angle and the other endpoint on the side opposite that vertex.
- A **perpendicular bisector** is a segment or line that passes through the midpoint of a side and is perpendicular to that side.

Examples:

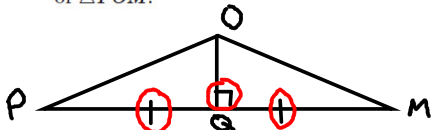
\overline{DF} is a median of $\triangle DEC$.
 \overline{EH} is an altitude of $\triangle DEC$.



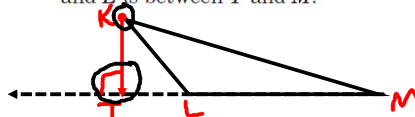
\overline{RV} is an angle bisector of $\triangle RST$.
 \overline{WZ} is a perpendicular bisector of side RS .

Draw and label a figure to illustrate each situation.

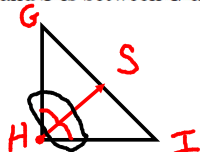
1. \overline{OQ} is a median and an altitude of $\triangle POM$.



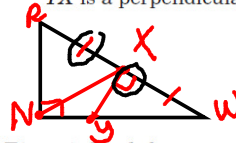
2. \overline{KT} is an altitude of $\triangle KLM$, and L is between T and M .



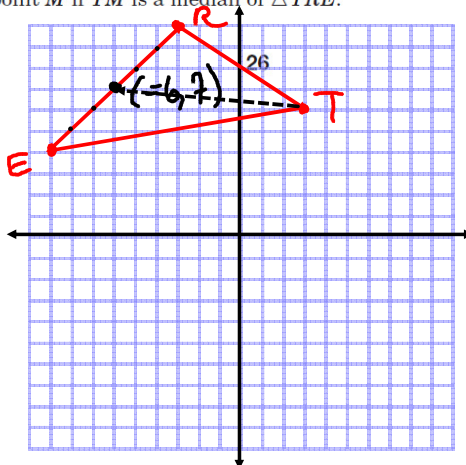
3. \overline{HS} is an angle bisector of $\triangle GHI$, and S is between G and I .



4. $\triangle NRW$ is a right triangle with right angle at N . \overline{NX} is a median of $\triangle NRW$. \overline{YX} is a perpendicular bisector of \overline{WR} .



5. $\triangle TRE$ has vertices $T(3, 6)$, $R(-3, 10)$, and $E(-9, 4)$. Find the coordinates of point M if \overline{TM} is a median of $\triangle TRE$.



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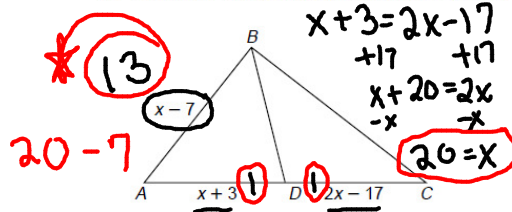
Geometry

Practice

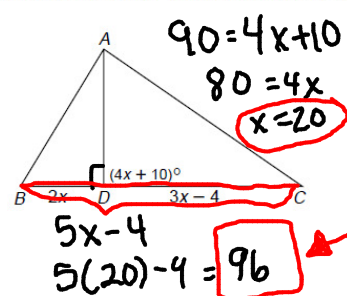
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Special Segments in Triangles

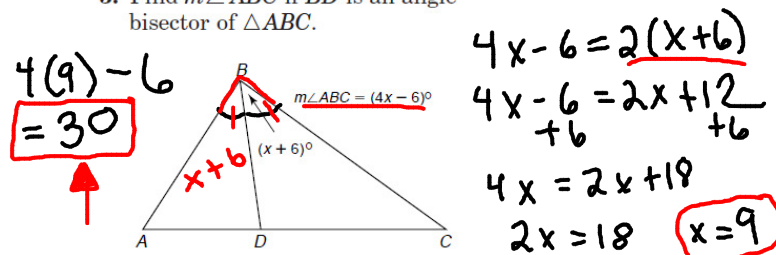
1. Find
- AB
- if
- \overline{BD}
- is a median of
- $\triangle ABC$
- .



2. Find
- BC
- if
- \overline{AD}
- is an altitude of
- $\triangle ABC$
- .



3. Find
- $m\angle ABC$
- if
- \overline{BD}
- is an angle bisector of
- $\triangle ABC$
- .

In Exercises 4-6, $A(2, 5)$, $B(12, -1)$, and $C(-6, 8)$ are the vertices of $\triangle ABC$.

4. What are the coordinates of
- K
- if
- \overline{CK}
- is a median of
- $\triangle ABC$
- ?

$$x = \frac{2+12}{2} = 7 \quad (7, 2) \quad y = \frac{5+(-1)}{2} = 2$$

5. What is the slope of the perpendicular bisector of
- \overline{AB}
- ? What is the slope of
- \overline{CL}
- if
- \overline{CL}
- is the altitude from point
- C
- ?

see graph

6. Point
- N
- on
- \overline{BC}
- has coordinates
- $(\frac{8}{5}, \frac{21}{5})$
- . Is
- \overline{NA}
- an altitude of
- $\triangle ABC$
- ? Explain your answer.

